IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1-30. (Cancelled).

31. (New) A method for forming an optical element that reflects radiation in a range from vacuum ultraviolet through X-ray, comprising:

forming on a substrate a multilayer film having a stack of alternating layers of high refractive index material and low refractive index material to control a wavefront phase and an amplitude of emerging rays; and

cutting away a portion of the multilayer film stack in accordance with an amount of adjustment of the wavefront phase, to adjust a wavefront phase of the emerging rays.

32. (New) The method according to claim 31, wherein the multilayer film stack is formed in a number of cycles larger than that necessary to saturate a reflectance.

33. (New) The method according to claim 31, wherein the cutting away of the multilayer film is controlled by detecting a difference in a material that forms the multilayer film stack.

34. (New) The method according to claim 33, wherein a difference in material is detected by monitoring a secondary electron discharge.

35. (New) The method according to claim 33, wherein a difference in material is detected by monitoring an optical change of characteristics.

36. (New) The method according to claim 35, wherein said optical change of characteristics monitored is a change in an optical constant of visible rays or a change based on ellipsometry.

37. (New) A method for forming an optical element that reflects radiation in a range from vacuum ultraviolet through X-ray, comprising:

forming on a substrate a multilayer film having a stack of alternating layers of high refractive index material and low refractive index material in a number of cycles larger than necessary to saturate reflectance;

forming a correction film on the multilayer film; and

cutting away a portion of the correction film and the multilayer film stack in accordance with an amount of adjustment of a wavefront phase of emerging rays.

38. (New) A multilayer film reflection mirror that reflects radiation in a range from vacuum ultraviolet through X-ray comprising:

a multilayer film formed by a plurality of repeated pairs of layers, layers of each pair of layers having different refractive indexes from each other, and more than one layer among said plurality of repeated pairs of layers adjusting a wavefront phase of a light reflected by said multilayer film.

39. (New) The multilayer film reflection mirror according to claim 38, wherein said wavefront is adjusted with more than one layer among said plurality of repeated pairs being partially removed.

40. (New) The multilayer film reflection mirror according to claim 39, wherein removal of the multilayer film is stopped at a portion of a layer having a relatively higher refractive index among said layers with different refractive indexes from each other.

41. (New) The multilayer film reflection mirror according to claim 40, wherein said layer having a relatively higher refractive index is made of silicon.

42. (New) The multilayer film reflection mirror according to claim 38, wherein the multilayer film is formed by repeated pairs of layers whose number exceeds a number at which reflectivity is substantially saturated.

43. (New) The multilayer film reflection mirror according to claim 42, wherein said wavefront is adjusted with more than one layer among the pairs of layers where the reflectivity is

already saturated being partially removed.

44. (New) The multilayer film reflection mirror according to claim 42, wherein reflectivity of said multilayer film is between about 15% and about 80%.

45. (New) The multilayer film reflection mirror according to claim 38, wherein said light is an EUV light.

46. (New) The multilayer film reflection mirror according to claim 38, wherein said multilayer film is formed by pairs of molybdenum and silicon layers.

47. (New) The multilayer film reflection mirror according to claim 38, wherein said multilayer film is one of a multilayer film formed by pairs of ruthenium and silicon layers, a multilayer film formed by pairs of rhodium and silicon layers, a multilayer film formed by pairs of ruthenium and carbon layers, or a multilayer film formed by pairs of rhodium and carbon layers.

48. (New) An exposure apparatus comprising:

a multilayer film reflection mirror reflecting radiation in a range from vacuum ultraviolet through X-ray and having a multilayer film formed by a plurality of repeated pairs of layers, layers of each pair of layers having different refractive indexes from each other, and more than one layer among said plurality of repeated pairs of layers partially adjusting a wavefront phase of a light reflected by said multilayer film.

49. (New) A method of manufacturing a multilayer film reflection mirror that reflects radiation in a range from vacuum ultraviolet through X-ray, comprising:

forming a multilayer film having a plurality of repeated pairs of layers, each pair of layers having layers with different refractive indexes from each other, and more than one layer among said plurality of repeated pairs partially adjusting a wavefront phase of a light reflected by said multilayer film.

50. (New) The method according to claim 49, further comprising partially removing at least one layer among said plurality of repeated pairs of layers in which said wavefront phase is adjusted.

51. (New) The method according to claim 50, wherein the removing of the multilayer film is stopped at a portion of a layer having a relatively higher refractive index among said layers in a pair having different refractive indexes from each other.

52. (New) The method according to claim 51, wherein said layer having a relatively higher refractive index is made of silicon.

53. (New) The method according to claim 49, wherein said multilayer film is formed by repeated pairs whose number exceeds a number at which reflectivity substantially is saturated.

54. (New) The method according to claim 53, further comprising partially removing more than one layer among the pairs of layers of the multilayer film where the reflectivity is already saturated.

55. (New) The method according to claim 53, wherein reflectivity of said multilayer film is between about 15% and about 80%.

56. (New) The method according to claim 49, wherein said light is an EUV light.

57. (New) The method according to claim 49, wherein said multilayer film is made from molybdenum and silicon layers.

58. (New) The method according to claim 49, wherein said multilayer film is one of a multilayer film formed with pairs of ruthenium and silicon layers, a multilayer film formed with pairs of rhodium and silicon layers, a multilayer film formed with pairs of ruthenium and carbon layers, or a multilayer film formed with pairs of rhodium and carbon layers.